TP-LINK®

User Guide

TL-WN322G
54M Wireless USB Adapter

• 2.4GHz • 802.11g/b

Rev:1.0

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FCC STATEMENT

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This device has been tested for compliance with FCC RF Exposure (SAR) limits in the typical laptop computer configuration and this device can be used in substantially similar laptop computers with side mounted PCMCIA slots. This device cannot be used with handheld PDAs (personal digital assistants) or other portable host devices. This device and its antenna must not be co-located or operated in conjunction with any other antenna or transmitter.

CE Declaration of Conformity

For the following equipment: TL-WN322G 54M Wireless USB Adapter

Is here with confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (89/336/EEC), Low-voltage Directive (73/23/EEC) and the Amendment Directive (93/68/EEC), the procedures given in European Council Directive 99/5/EC and 89/3360EEC.

The equipment was passed. The test was performed according to the following European standards:

- EN 300 328 V.1.4.1 (2003)
- EN 301 489-1 V.1.4.1 (2002) / EN 301 489-17 V.1.2.1 (2002)
- EN 60950-1: 2001

European standards dictate maximum radiated transmit power of 100mW EIRP and frequency range 2.400-2.4835GHz; In France, the equipment must be restricted to the 2.4465-2.4835GHz frequency range and must be restricted to indoor use.

Package Contents **1**

Chapter 1 Introduction **2**

1.1 Features 2

1.2 LED Status 2

1.3 System Requirements 2

1.4 Network Configuration 3

Chapter 2 Installation Guide **5**

2.1 Before You Begin 5

2.2 Installing the Drivers 5

Chapter 3 Uninstall Guide **8**

3.1 Through Control Panel 8

3.2 Through Programs 9

Chapter 4 Software Configuration **12**

4.1 Station Mode Configuration 12

4.1.1 More Setting 12

4.1.1.1 General Connection Setting 12

4.1.1.2 WEP Encryption 16

4.1.1.3 WPA/WPA2 Authentication with TKIP/AES Encryption 17

4.1.1.4 WPA-PSK Authentication 20

4.1.1.5 Profiles 20

4.1.1.6 Advanced Settings 21

4.2 Wireless network mode configuration 22

Chapter 5 Examples for application **24**

5.1 Configuration of WEP Encryption 24

5.2 Configuration of PSP Mode 26

Appendix A: Glossary **30**

Appendix B: Specifications **32**

Appendix C: Contact Information **33**

Package Contents

Open the package carefully, and make sure that none of the items listed below are missing.

- One TL-WN322G 54M Wireless USB Adapter
- One USB extension cable
- One TL-WN322G 54M Wireless USB Adapter Resource CD, including**:**
  - Drivers and Utility
  - User Guide
  - Other Helpful Information

Note:

Make sure that none of the items listed above are missing. Do not discard the packing materials, in case of return; the unit must be shipped in its original package.

Chapter 1 Introduction

The TL-WN322G 54M Wireless USB Adapter is a USB 2.0 pen-size wireless adapter supporting IEEE 802.11b/g 2.4GHz radio operation. It provides high-speed wireless connection with data rate up to 54Mbps. Additionally , wireless roaming allows the user to move among different AP without losing the current connection. The adapter provides excellent security features including：TKIP, AES, WPA, and up to 256 bit WEP encryption security make the network almost impenetrable.

Featuring high performance transmission rates, simple installation and adaptability, as well as strong security the TL-WN322G 54M Wireless USB Adapter is the perfect solution for small office and home needs.

1.1 Features

- Complies with IEEE 802.11b and IEEE 802.11g Standards.
- Provided 64/128/256 bit WEP Encryption.
- Supports WPA, WPA2, IEEE 802.1X, TKIP, AES.
- Supports 54/48/36/24/18/12/9/6Mbps or 11/5.5/3/2/1Mbps wireless LAN data transfer rates.
- USB 2.0 interface and compatible with USB 1.1.
- High Speed Data Rate Up to 54Mbps.
- Supports Windows 98, ME, 2000, XP, 2003, 64bit XP.
- Simulated AP Mode, And Supports PSP connection.

1.2 LED Status

The TL-WN322G 54M Wireless USB Adapter has a LED indicator and a built-in antenna for wireless connectivity.

LED Indicator:

- **Ad-hoc Mode:** Solid Green, whether the wireless device is connected or not.
- Infra**structure Mode**: Solid green while connected, and blinking during activity.

1.3 System Requirements

The following are the minimum system requirements in order to use the TL-WN322G 54M Wireless USB Adapter.

- PC/AT compatible computer with a USB interface.
- Windows 98/ME/2000/XP/2003/64bit XP operating system.
- (Windows 98/ME don’t support USB 2.0, the performance could influenced)

1.4 Network Configuration

To better understand how the wireless LAN products work together to create a wireless network, it might be helpful to depict a few of the possible wireless LAN PC card network configurations. The wireless LAN products can be configured as:

Ad-hoc (peer-to-peer) Mode

This is the simplest network configuration with several computers equipped with the PC Cards that form a wireless network whenever they are within range of one another. In ad-hoc mode, each client is peer-to- peer, would only have access to the resources of the other client and does not require an access point. This is the easiest and least expensive way for the SOHO to set up a wireless network.

The image below depicts a network in ad-hoc mode.

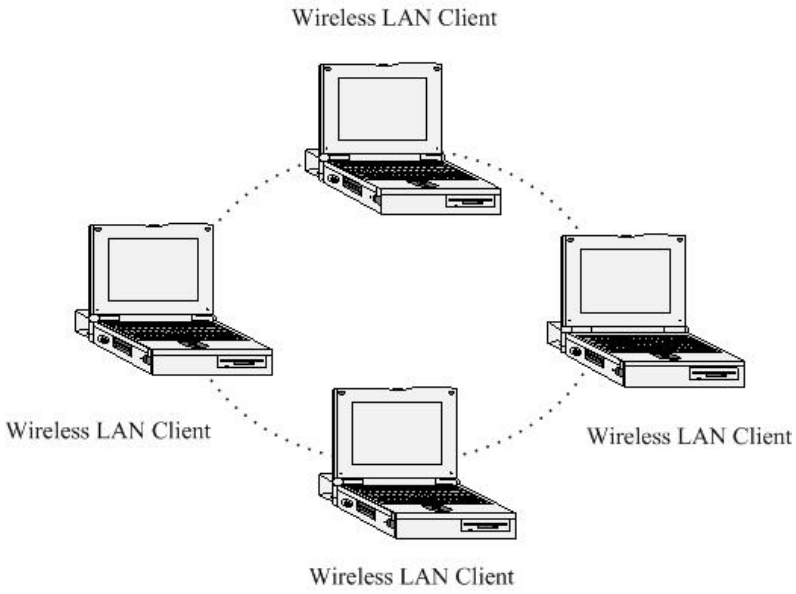


Figure 1-1 Ad-hoc mode.

Infrastructure Mode

The infrastructure mode requires the use of an access point (AP). In this mode, all wireless communication between two computers has to be via the AP. It doesn't matter if the AP is stand-alone or wired to an Ethernet network. If used in stand-alone, the AP can extend the range of independent wireless LANs by acting as a repeater, which effectively doubles the distance between wireless stations.

The image below depicts a network in infrastructure mode.

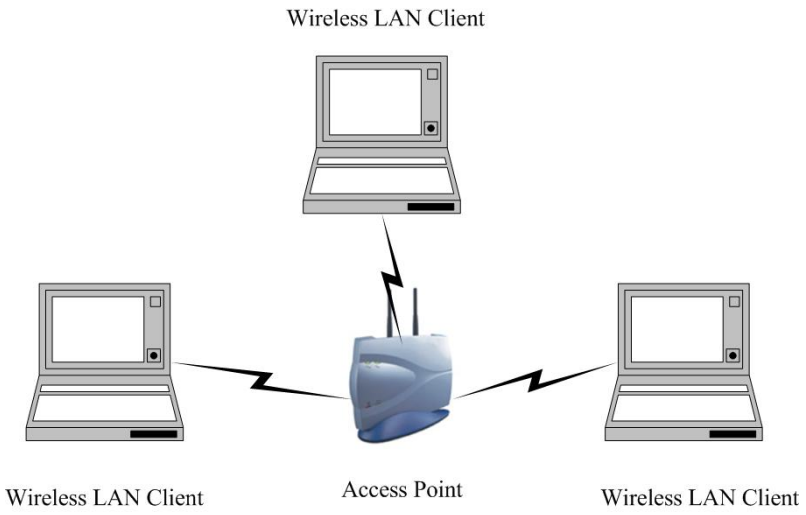


Figure 1-2 Infrastructure mode.

Chapter 2 Installation Guide

2.1 Before You Begin

Before installing the new drivers of your TL-WN322G 54M Wireless USB Adapter, you need to disable all of the Wireless LAN drivers that you have installed.

During the installation, Windows 98/ME/2000/XP/2003/64bit XP may need to copy systems files from its installation CD. Therefore, you may need a copy of the Windows installation CD at hand before installing the drivers.

2.2 Installing the Drivers

Follow the steps below in order to install the TL-WN322G 54M Wireless USB Adapter drivers:

- Insert the Resource CD into your CD-ROM drive, Click the **Start** button and choose **Run**. In the field that appears, enter F:\XXX\Setup.exe(if "F" is the letter of your CD-ROM drive; XXX represents the setup program path, which is labeled on the Resource CD).
- Once the setup begins you will see the **Install Shield Wizard**, as the image depicts below.

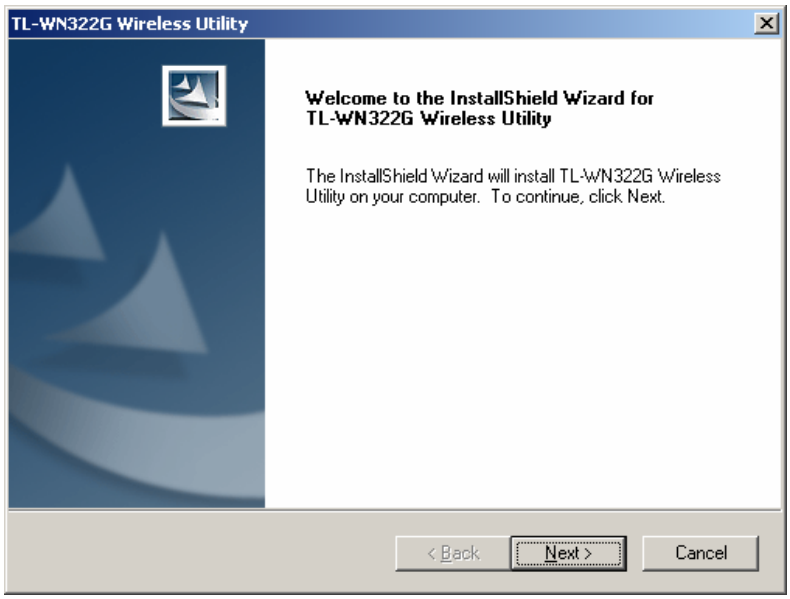


Figure 2-1 Install driver wizard

- Click on the **Next** button to continue.
- Select the location where you would like the driver installed. Click on the **Browse** button to change the directory, or click on the **Next** button to continue using the default directory.

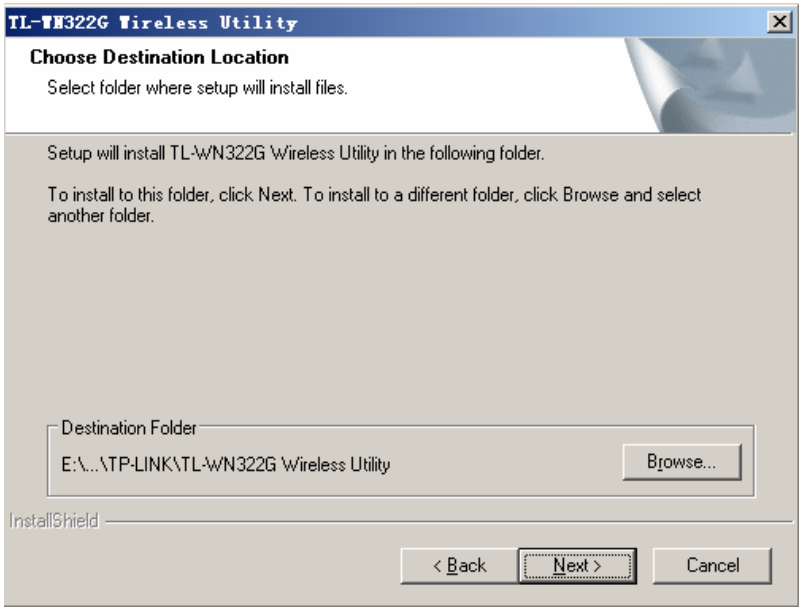


Figure 2-2 Install Shield—Choose Destination Location

➢ Wait a few moments until the files are copied to the computer.

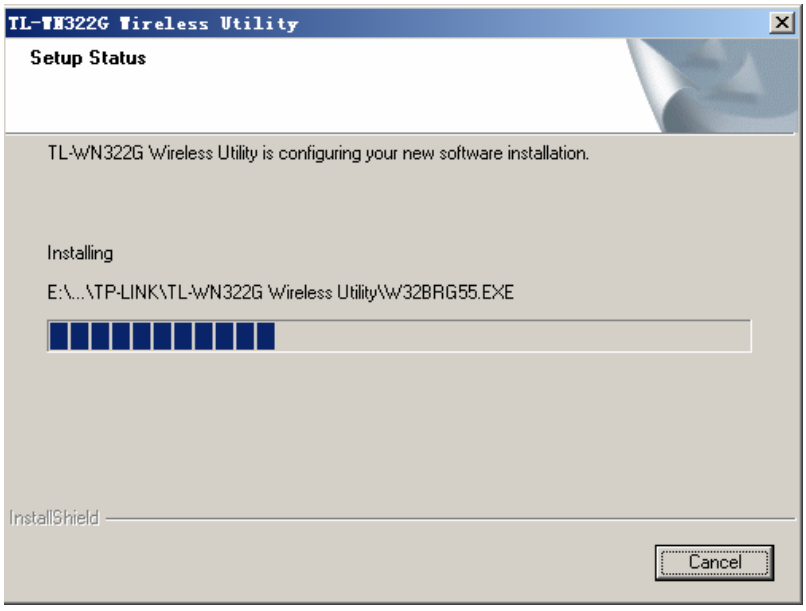


Figure 2-3 Install Shield—Setup Status

➢ The first part of the installation is complete. Click on the **Finish** button.

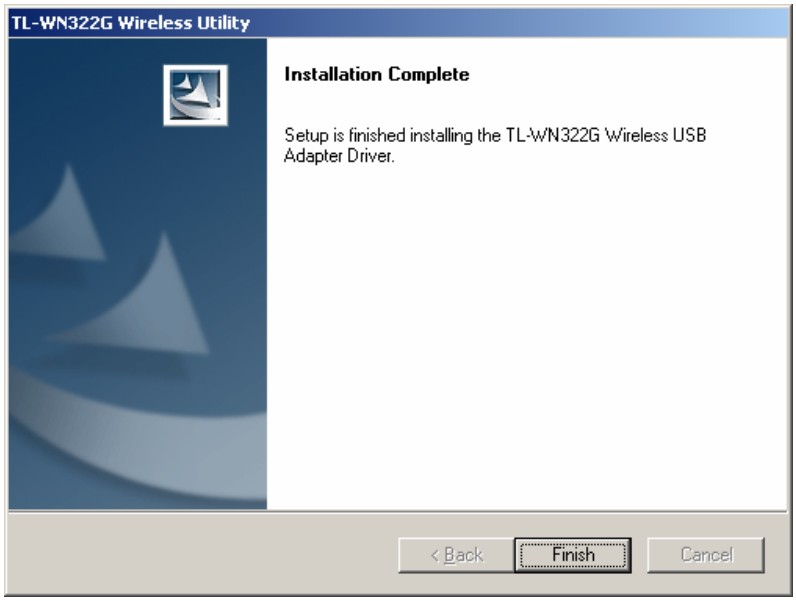


Figure 2-4 Installation Complete

At this point, carefully insert the device into the USB port of your computer. Windows will automatically detect the device and display the icon and below in the taskbar.

Chapter 3 Uninstall Guide

If the device installation is unsuccessful for any reason, the best way to solve the problem may be to completely uninstall the device and its utility and repeat the installation procedure again. Hereby, customers can use one of the following two methods to uninstall the Drivers and Utility.

3.1 Through Control Panel

Follow the steps below in order to uninstall the Drivers and Utility:

1. Click on **Start > Settings > Control Panel > Add or Remove Programs**
2. You will then see the following window. Select the **TL-WN322G Wireless Utility** and then click on **Remove**.

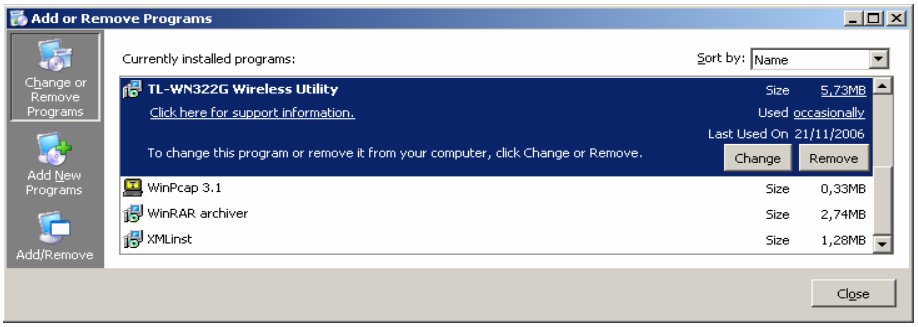


Figure 3-1 Add or Remove Programs

3. Click on the **OK** button to confirm the Uninstalling process.

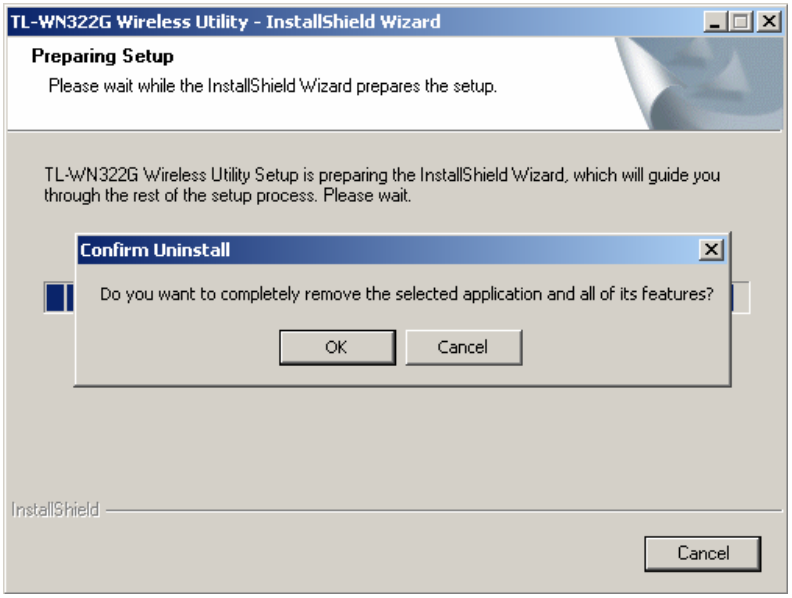


Figure 3-2 Confirm the Uninstalling process.

4. The process will then remove TL-WN322G Wireless Utility and the drivers from your computer. Click on the **Finish** button and then remove the TL-WN322G 54M Wireless

USB Adapter.

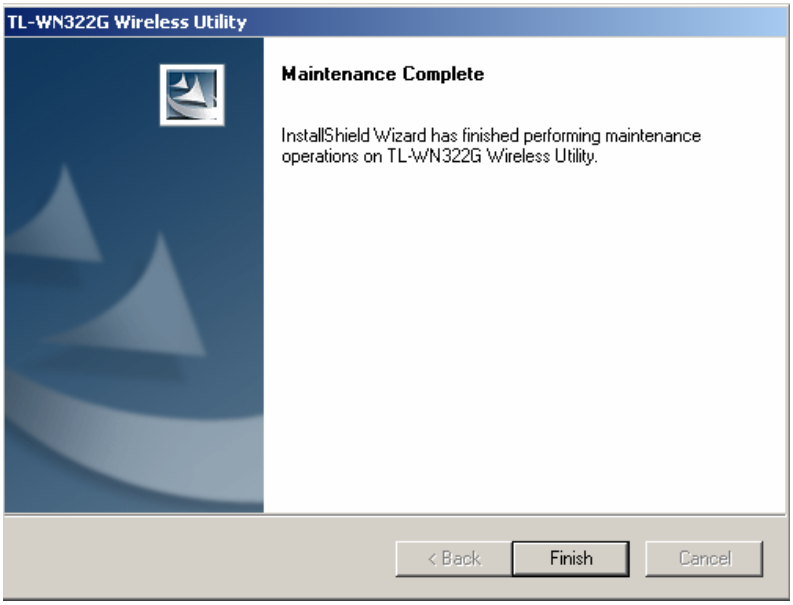


Figure 3-3 Uninstalling process finished

3.2 Through Programs

Follow the steps below in order to uninstall the Drivers and Utility:

- Click on **Start > programs > TP-LINK> TL-WN322G Wireless Utility> Uninstall TL-WN322G Wireless Utility.**

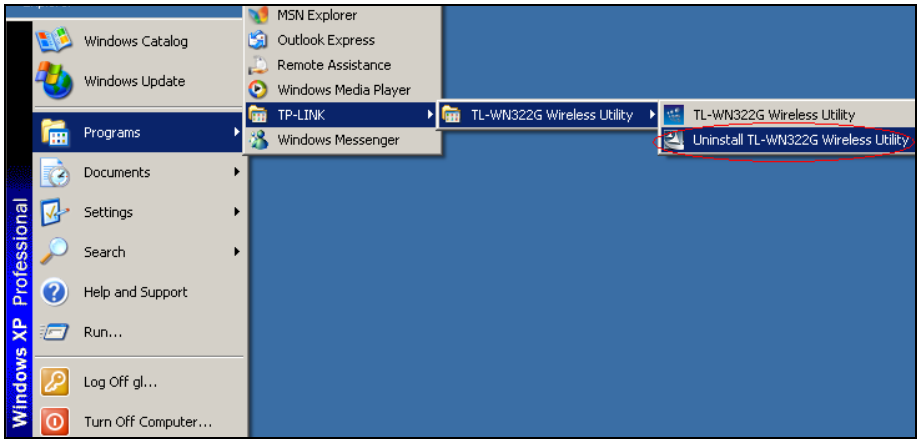


Figure 3-4 Uninstall from programs

- Then, process will go to **Install Shield Wizard**. The screen will pop up the following conversation **"Do you want to completely remove the selected application and all of its features"**
- Click on the **OK** button to confirm the Uninstalling process.

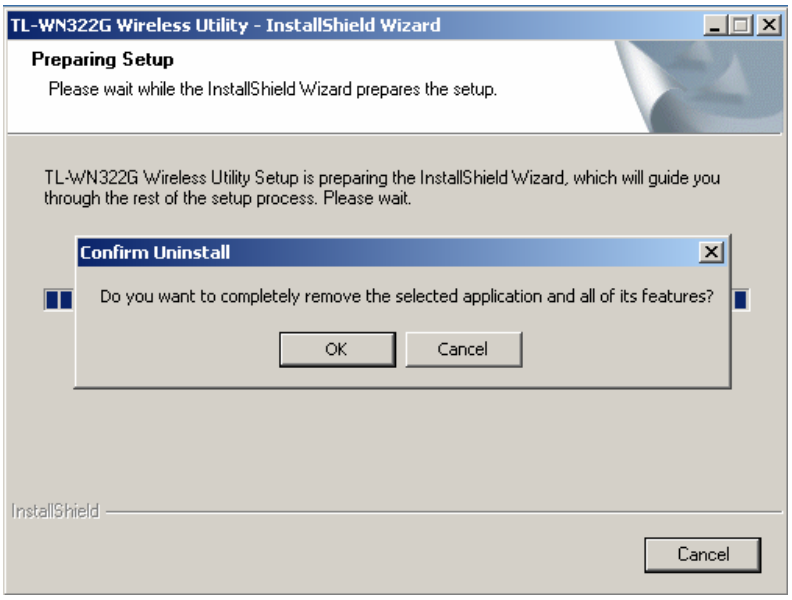


Figure 3-5 Confirm the Uninstalling process.

The process will then remove TL-WN322G Wireless Utility and the drivers from your computer.

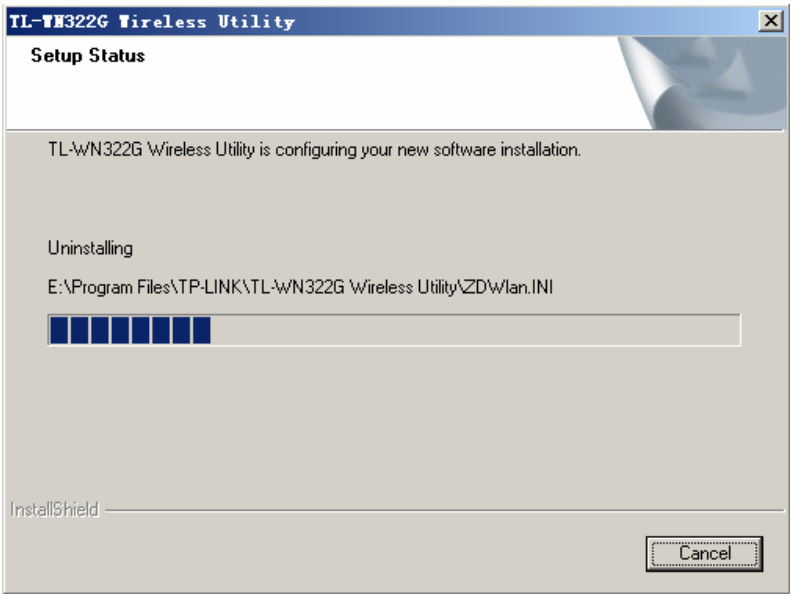


Figure 3-6 Uninstalling TL-WN322G Wireless Utility and the drivers

- Click on the **Finish** button and then remove the TL-WN322G 54M Wireless USB Adapter.

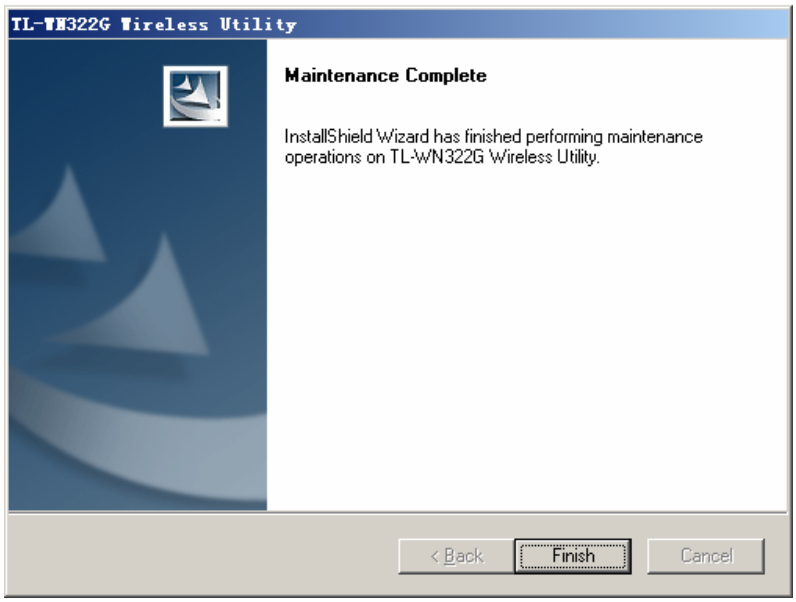


Figure 3-7 Uninstalling process finished

Chapter 4 Software Configuration

4.1 Station Mode Configuration

This chapter focuses on how to configure the device in Station mode (wireless LAN client)

➢ **Current Network Information**

The **Current Network Information** screen displays the current status of the wireless radio as a station.

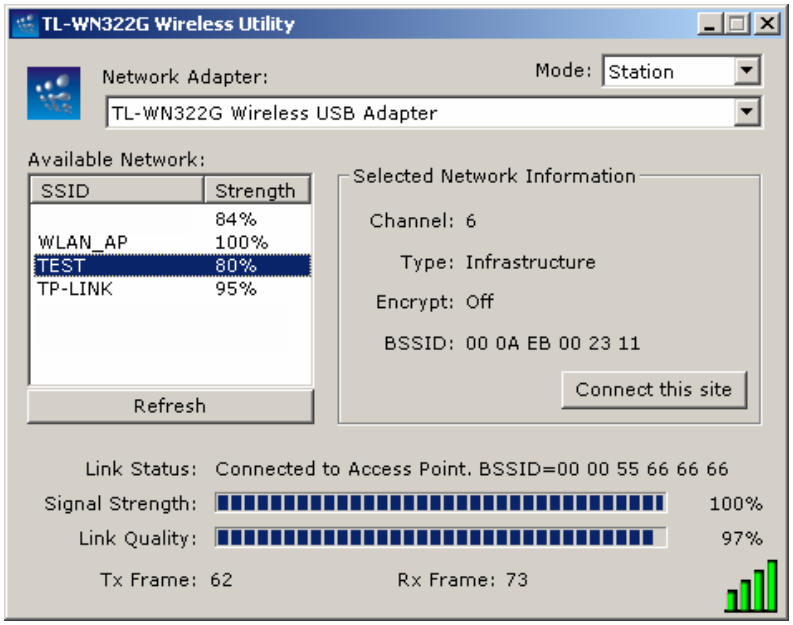


Figure 4-1 Current Network Information

4.1.1 More Setting

4.1.1.1 General Connection Setting

The **General Connection Setting** allows you to configure the SSID, network type, authentication, and encryption type.

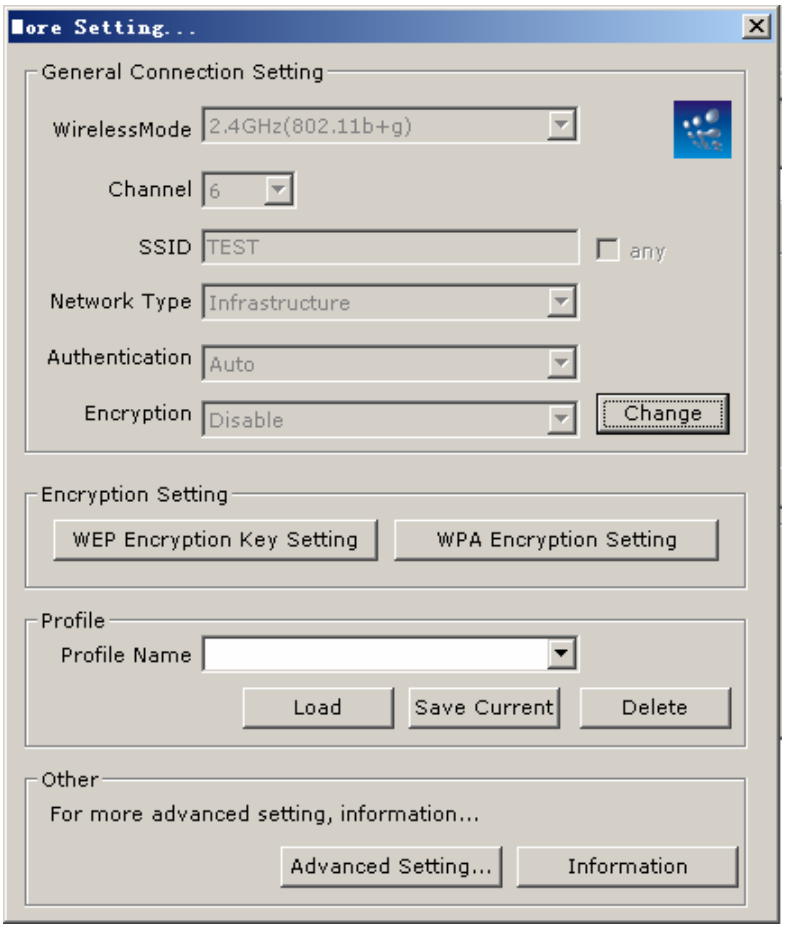


Figure 4-2 More setting

- You can click "**Change**" button to change general connection settings.

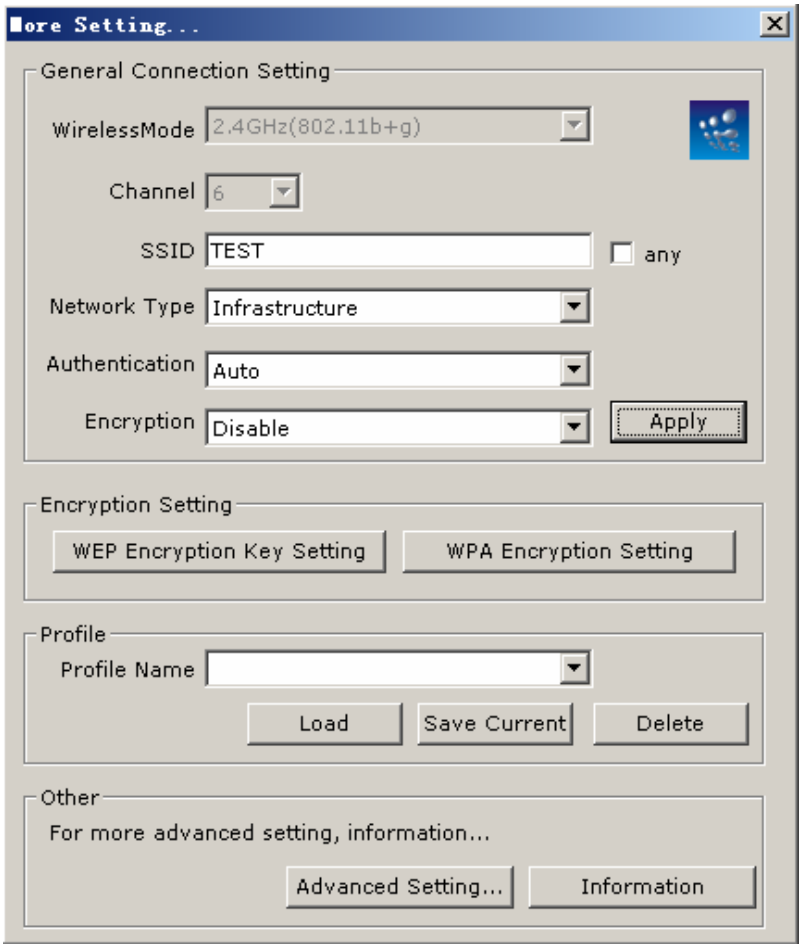


Figure 4-3 More setting—Click Change

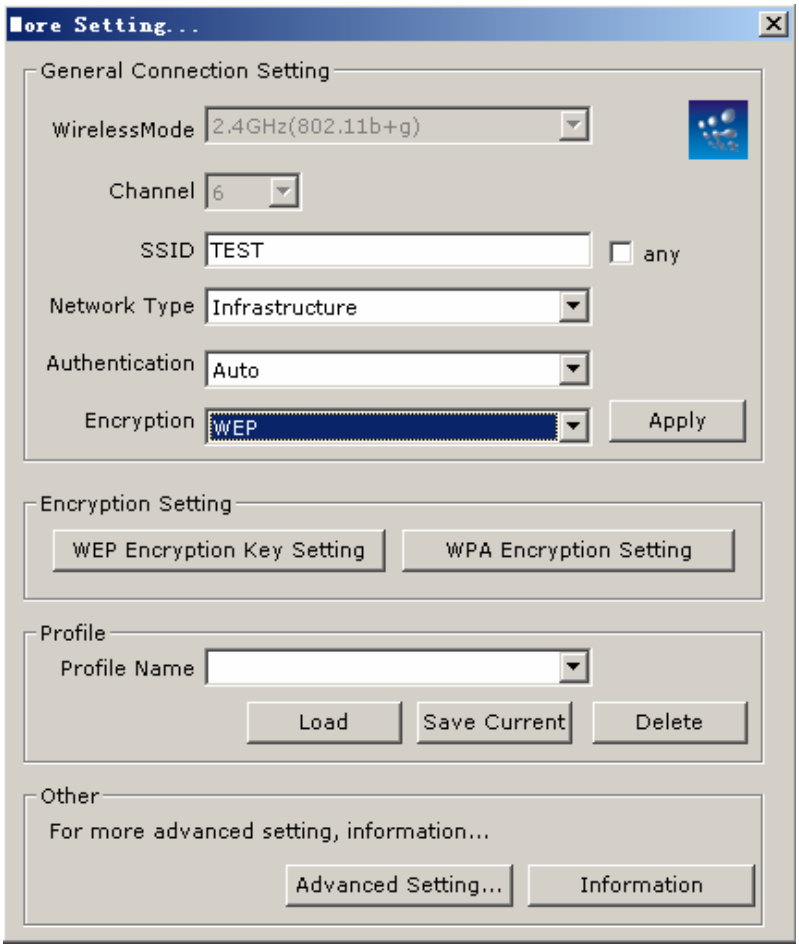


Figure 4-4 More setting—WEP

- **SSID:** Enter the SSID of the network. The SSID is a unique name shared among all points in your wireless network. The SSID must be identical for all points in the network, and is case-sensitive. Place a check in the **any** box if you would like the device to connect to the first available Access Point with the strongest signal.
- **Network Type:** Select a network type from the drop-down list.
- **Infrastructure** or **Ad-hoc:** If you select infrastructure, the device must be connected to an Access Point. If you select ad-hoc, you may connect the device to another WLAN client adapter (such as this one).
- **Authentication:** Select an authentication type from the drop down list. Options available are: **Auto, Open System, Shared Key, WPA, WPA-PSK, WPA2, WPA2-PSK**.
- **Encryption:** Select an encryption type from the drop-down list. Options available are: **Disable, WEP, TKIP, AES**.

Note: Refer to the **WEP encryption** and **WPA encryption** sections in this chapter to configure the security settings.

4.1.1.2 WEP Encryption

You may select 64, 128 or 256 bit WEP (Wired Equivalent Privacy) key to encrypt data (Default setting is Disable). WEP encrypts each frame transmitted from the radio using one of the Keys from a panel. When you use WEP to communicate with the other wireless clients, all the wireless devices in this network must have the same encryption key or pass phrase.

- **Authentication:** Select **Open System** or **Shared Key** from the drop-down list. If you are not sure what to choose, please select **auto**.
- **Encryption:** Select WEP from the drop-down list.
- Click on the **WEP Encryption Key Setting** button. You will see the figure below.

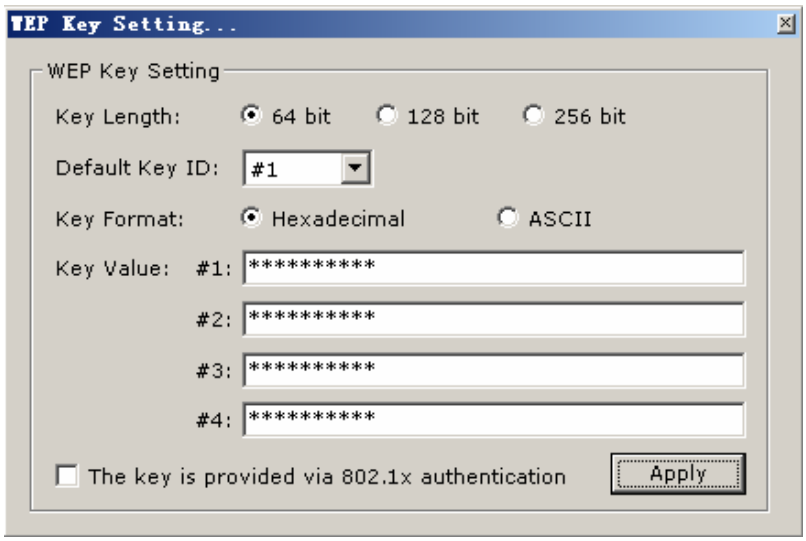


Figure 4-5 WEP Key Setting

- **Key Length:** Select an encryption key length: **64**, **128** or **256 bit**. The setting must be the same as the Access Point.
- **Default Key ID:** Since you can specify up to 4 different WEP keys, select the WEP key value that will be used for this network.
- **Key Format:** Select Hexadecimal or ASCII.
- **Key Value #1 - #4: You may enter up to 4 different WEP keys. However, only that WEP key** will be used that is defined by the **Default Key ID**.

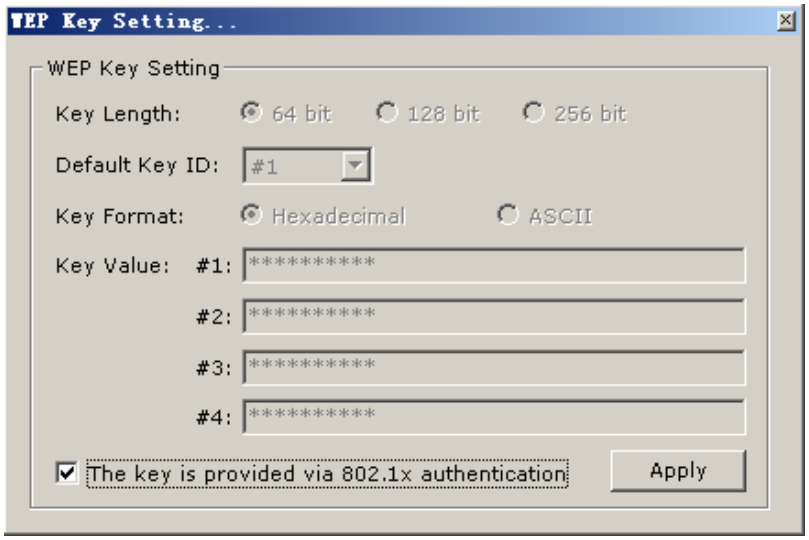


Figure 4-6 Disabled WEP key settings

- **The key is provided via IEEE 802.1X authentication:** Place a check in this box is IEEE 802.1X authentication is used. By selecting this option, the WEP key settings will be disabled.
- Click on the **Apply** button, and then you can use the IEEE 802.1X authentication.

4.1.1.3 WPA/WPA2 Authentication with TKIP/AES Encryption

WPA (Wi-Fi Protected Access) was designed to improve upon the security features of WEP (Wired Equivalent Privacy). The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. WPA provides improved data encryption through the Temporal key Integrity Protocol (TKIP), which scrambles the keys using a hashing algorithm and by adding an integrity checking feature which makes sure that keys haven't been tampered with.

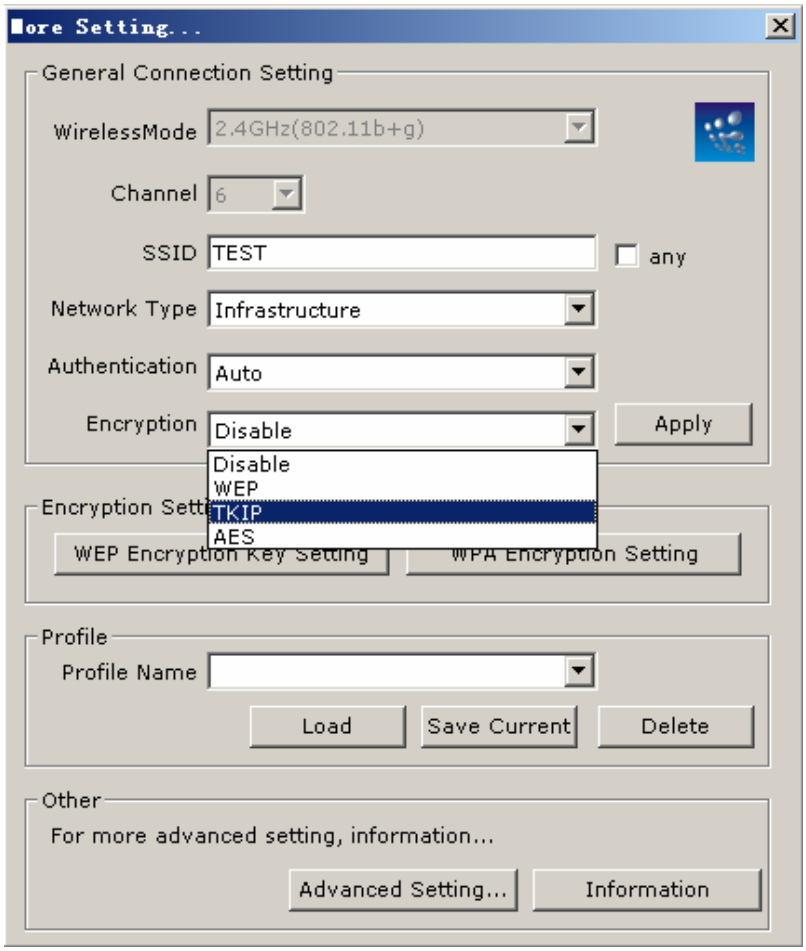


Figure 4-7 More settings—TKIP

- **Authentication:** Select **WPA** from the drop-down list.
- **Encryption:** Select **TKIP** or **AES** from the drop-down list.
- Click on the **WPA Encryption Setting** button.

In this section you can configure the settings for TLS or PEAP. TLS (Transport Layer Security) is an IETF standardized authentication protocol that uses PKI (Public Key Infrastructure) certificate-based authentication of both the client and authentication server.

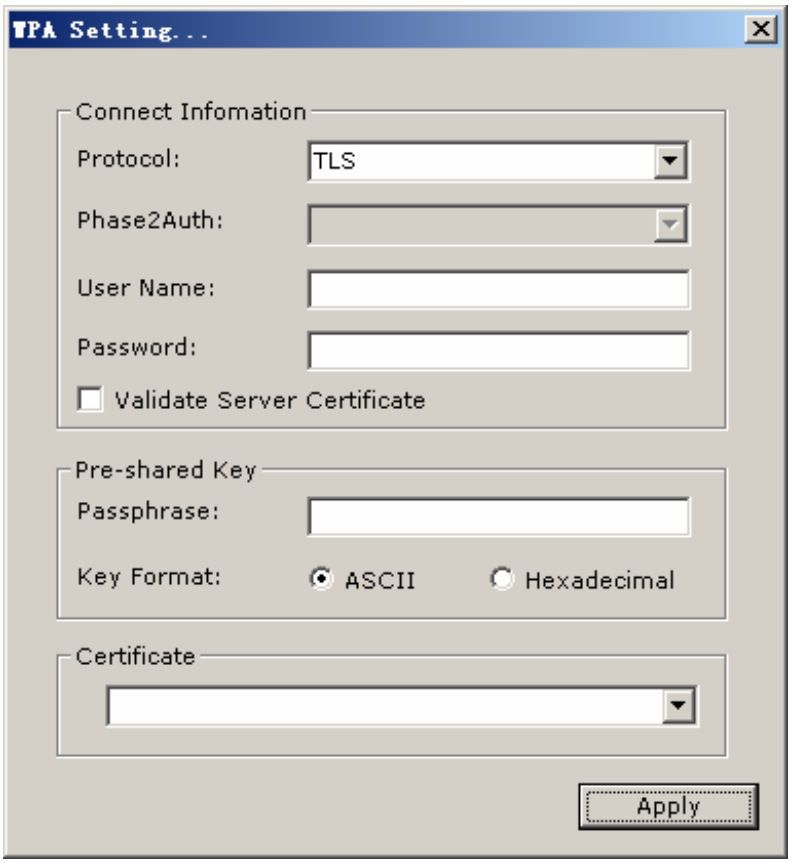


Figure 4-8 WPA setting

- **Protocol:** Select **TLS** from the drop-down list.
- **User Name:** Enter the user name that is used for authentication purposes.
- **Passphrase:** Enter a WPA passphrase. For ASCII text, enter 8-63 characters, for hexadecimal enter 64 characters).
- **Certificate:** Make sure that you have downloaded and installed the certificate on the computer. Then select the appropriate certificate from the drop-down list.
- Click on the **Apply** button to save the changes.

The PEAP authentication type is based on EAP TLS authentication, but uses a password instead of a client certificate for authentication. PEAP uses a dynamic session-based WEP key, which is derived from the device and RADIUS server, to encrypt data.

4.1.1.4 WPA-PSK Authentication

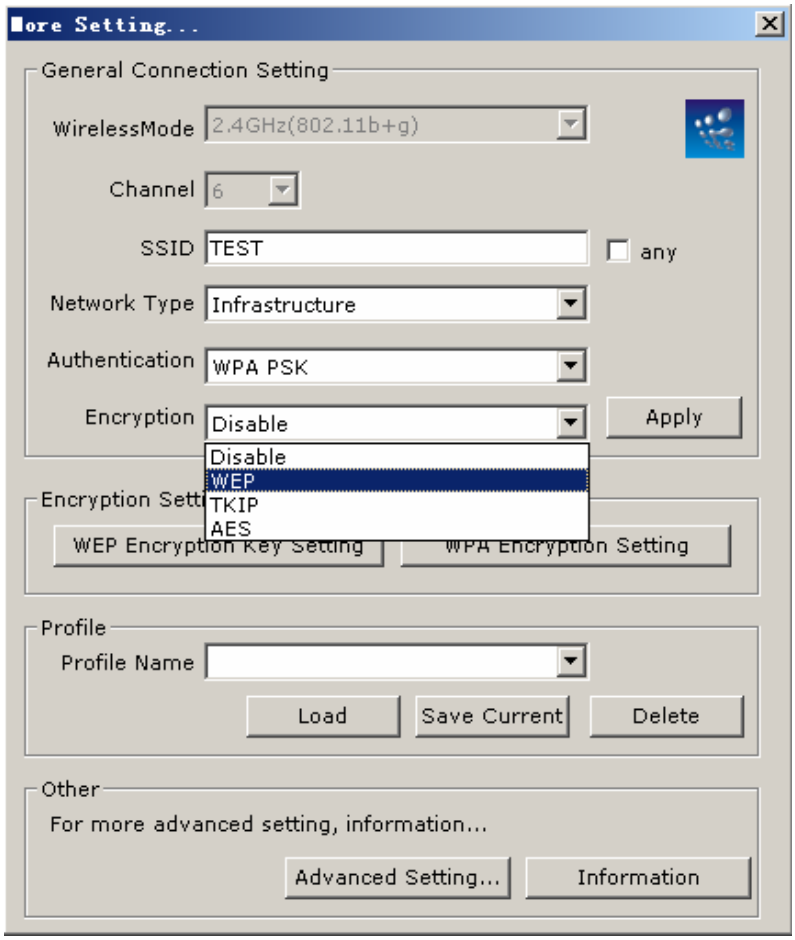


Figure 4-9 WPA-PSK Authentication

- **Authentication:** Select **WPA-PSK** from the drop-down list.
- **Encryption:** Select an encryption type from the drop-down list.
- Click on the **Apply** button to save the changes.

4.1.1.5 Profiles

Multiple profiles can be created for different Network Names (SSIDs) and security settings. This allows a user to quickly associate with another network, instead of entering the credentials each time.

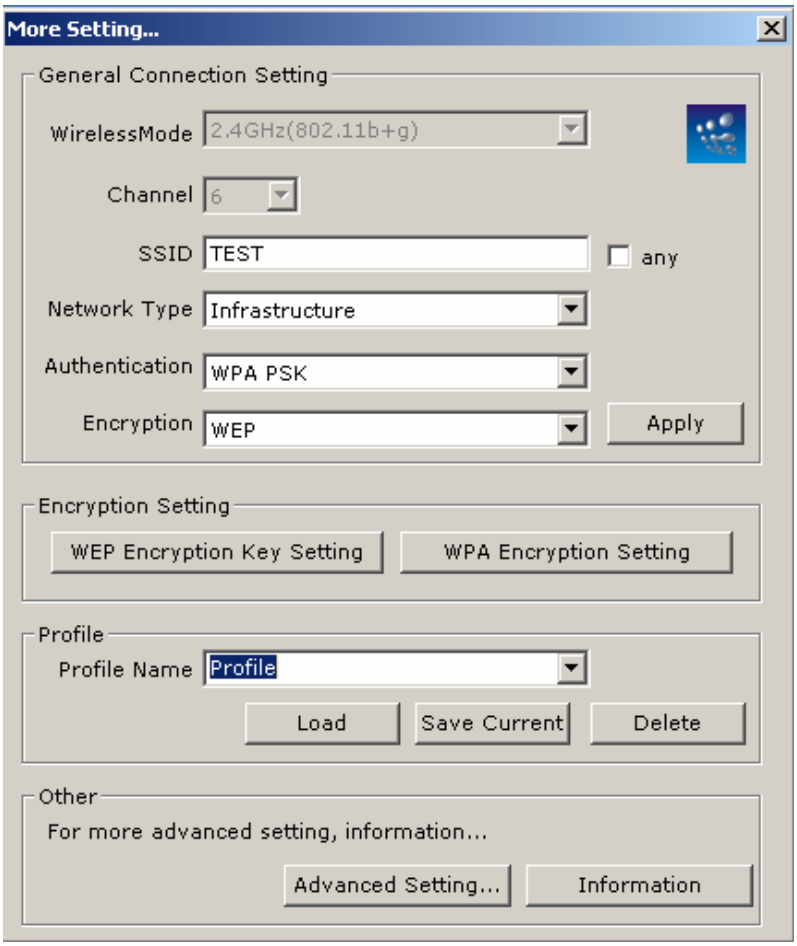


Figure 4-10 More Setting—Profile

- **Profile Name:** Displays the name of current profile. One device can have many profiles, but only one profile can be loaded at a time.
- **Load:** Select a profile from the drop-down list and then click on the **Load** button.
- **Save Current:** Enter a new profile name and then click on the **Save Current** button to save the profile.
- **Delete:** To delete an existing profile, select it from the drop-down list and then click on the **Delete** button.

4.1.1.6 Advanced Settings

The Advanced Settings allows you to configure the user interface language, power consumption, and threshold values.

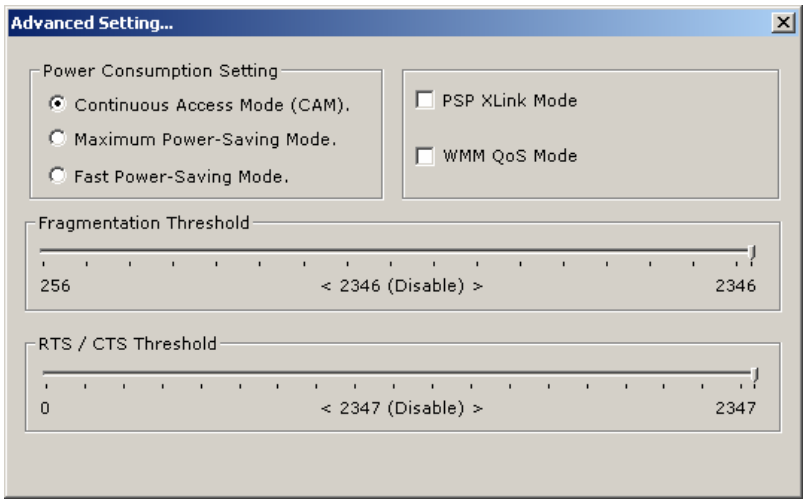


Figure 4-11 Advanced Setting

- **Power Consumption Setting:** If your desktop or notebook is connected to external power, select **Continuous Access Mode (CAM)**, if your notebook is using a battery, select **Maximum Power-Saving Mode**, or **Fast Power-Saving Mode**.

4.2 Wireless network mode configuration

The screen of wireless network mode displays as below:

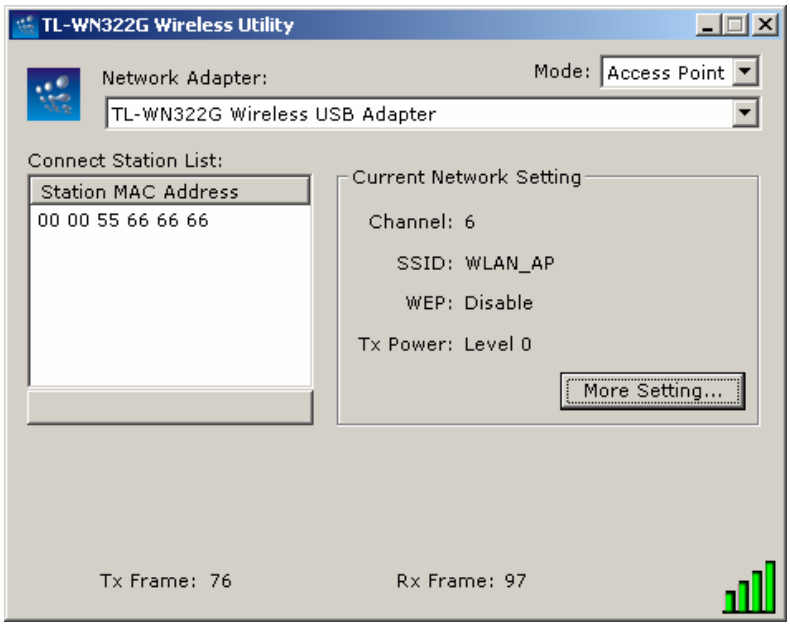


Figure 4-14 Wireless network mode

The more setting screen:

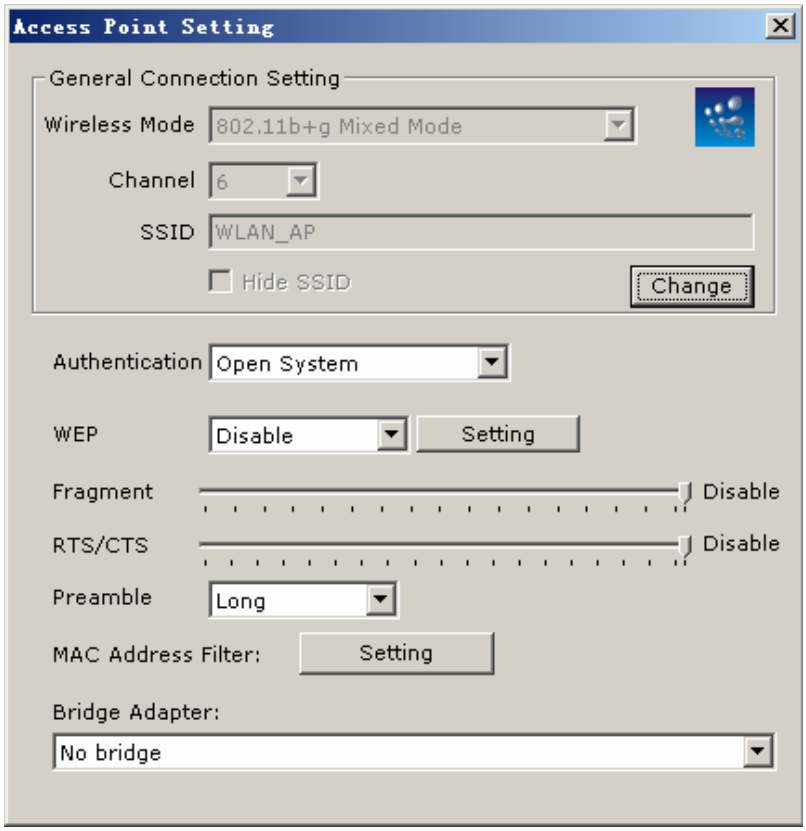


Figure 4-15 Access point setting

Chapter 5 Examples for application

5.1 Configuration of WEP Encryption

Suppose you have an installed and using AP, the SSID is TEST and it adopts 64 bit WEP encryption with the key “1111111111”.

To establish a connection with this AP, you should follow five steps below：

Double click “TEST” in available network taskbar to connect this network.

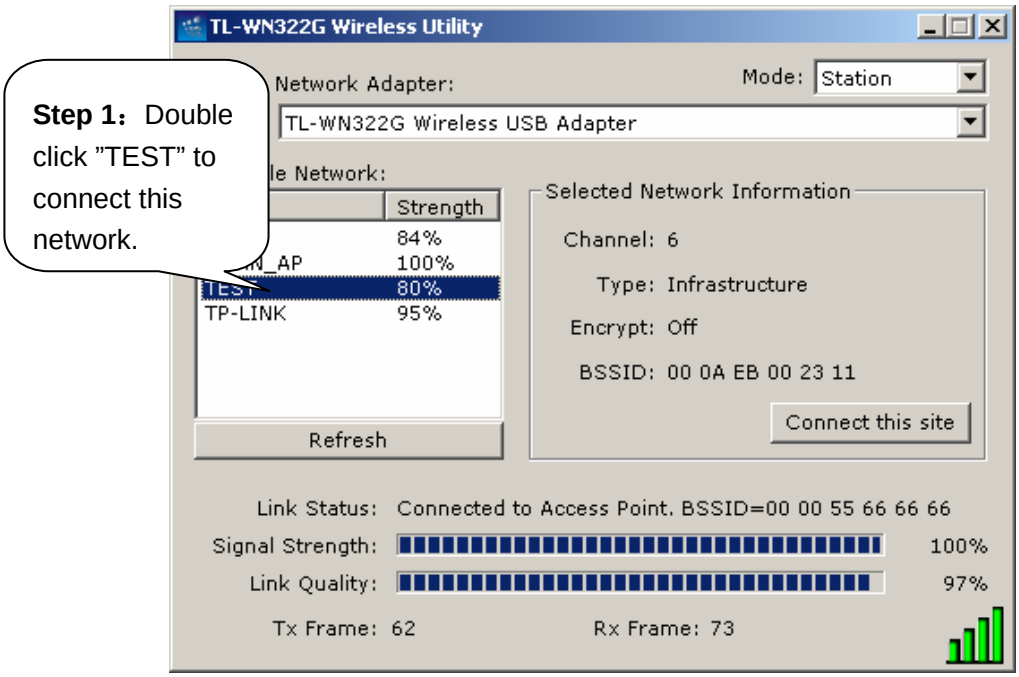


Figure 5-1

Click “No” to continue.

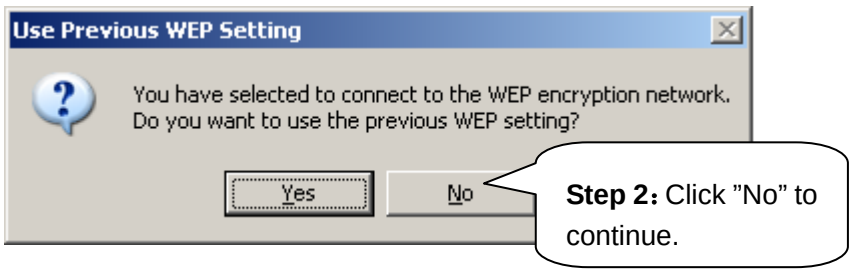


Figure 5-2

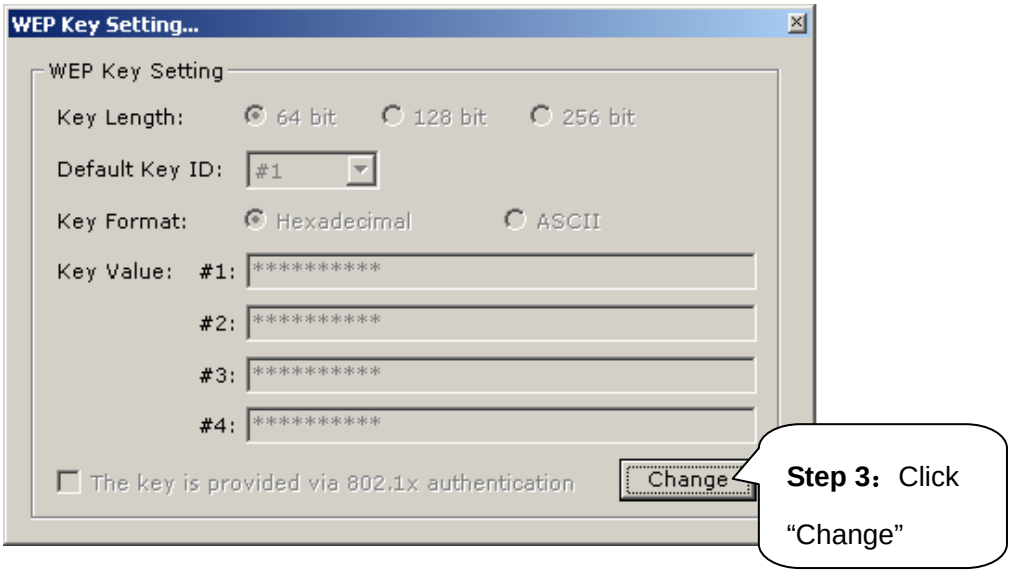


Figure 5-3

In WEP key setting dialogue box click “change" to continue our setting.

- Key length： 64 bit
- Default key ID：#1
- Key format：Hexadecimal
- Key value：enter “1111111111” in #1

Click the close button in top right left of the screen, and it will return to the screen of wireless utility. till now we have finished WEP encryption configuration.

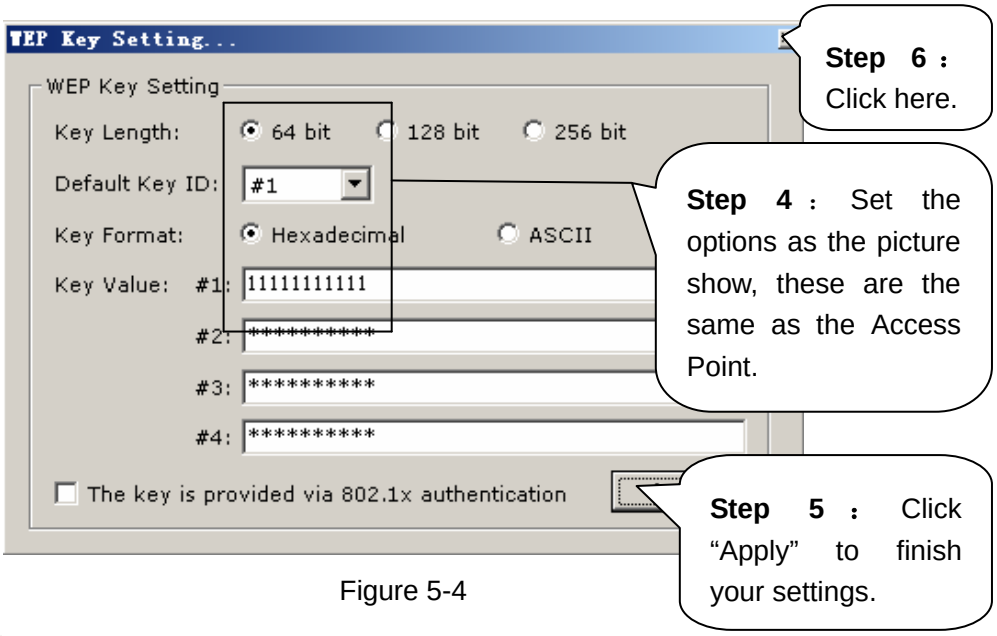


Figure 5-4

Click the “ ”

5.2 Configuration of PSP Mode

There is two parts of this setting：

Part 1：Configuration of our TL-WN322G 54M Wireless USB Adapter

Step One： Select “Access Point” from the drop down list.

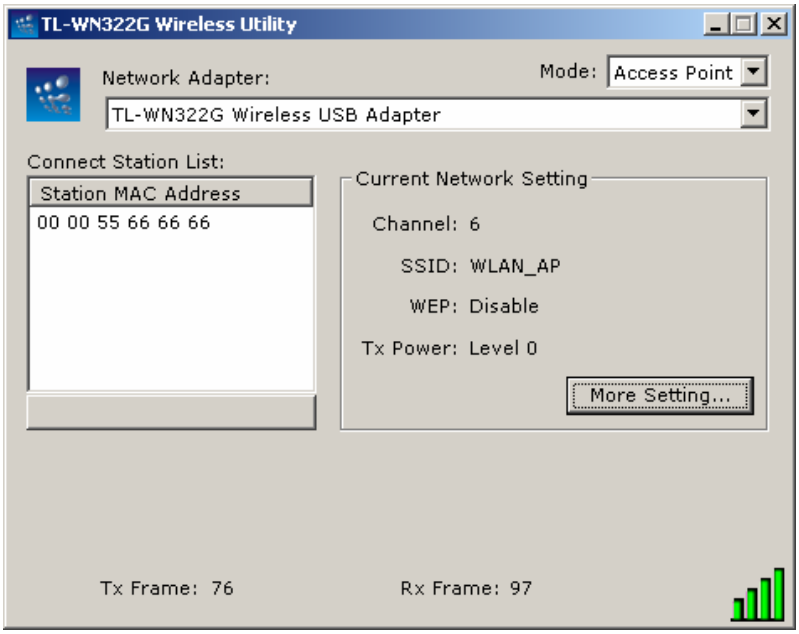


Figure 5-5

Step Two： Select “More Setting”, you can use default network SSID WLAN-AP, channel 6, and then choose WEP Encryption, and enter WEP keys.

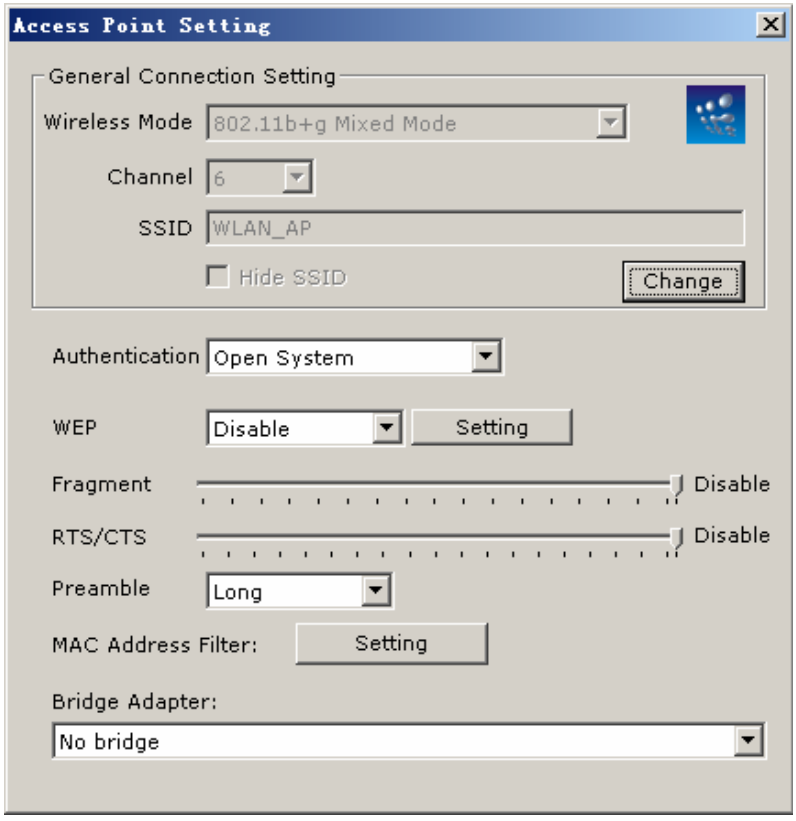


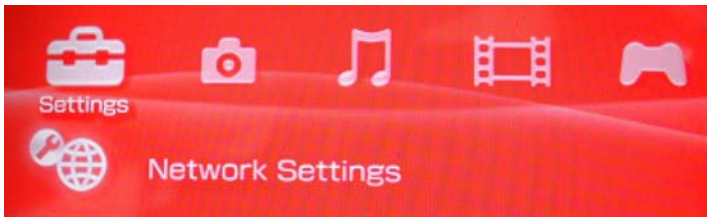
Figure 5-6

Remark:

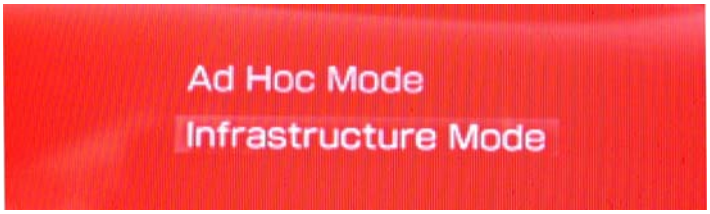
You can change the default network SSID and channel by yourself. If you didn't startup WEP Encryption, any PSP could link in, and the wireless network won't be protected by encryption key.

Part 2： PSP setting

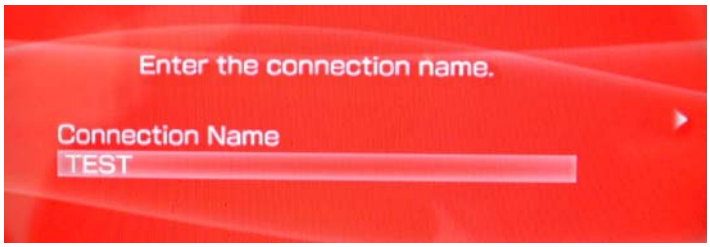
Step One： Choose "Network Settings"



Step Two： Choose "Infrastructure Mode"

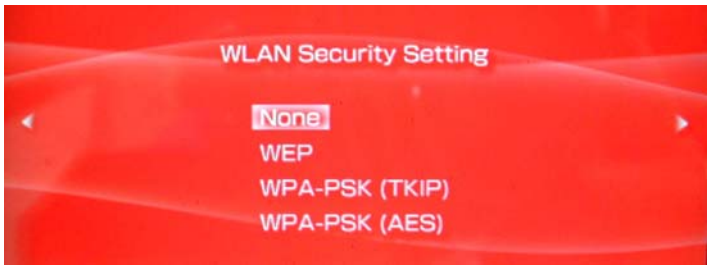


Step Three： Establish a new connection , enter the name of this connection. (any is ok),we use TEST for example.

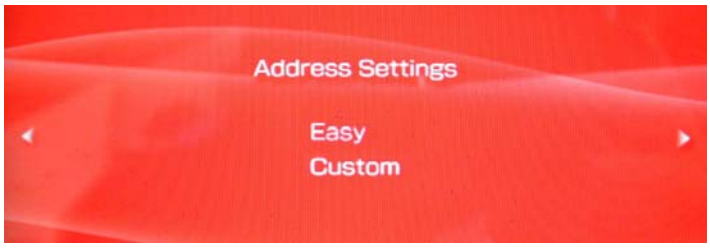


Step Four： Select SCAN, and let PSP scan the nearer AP automatic，then choose the default network SSID WLAN_AP of TL-WN322G 54M Wireless USB Adapter.

Step Five： ”WLAN Security Setting” If you haven’t set pass phrase. select the first ”None” .if you have set the pass phase, select the second “WEP”, the pass phase must identical with WEP key that you have set.

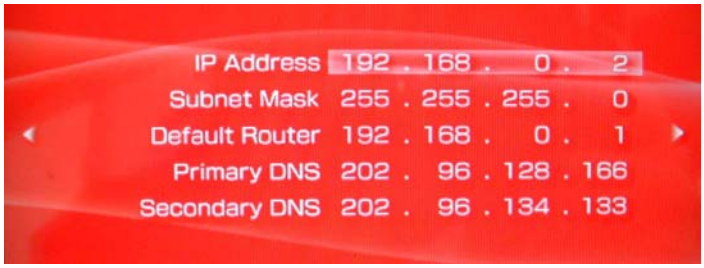


Step Six： Select address settings mode—Easy



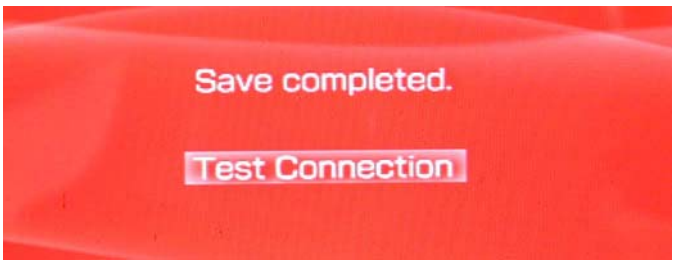
Step Seven： In “IP Address Setting”screen ,we select “Manual”

Step Eight： In ”Address Setting” screen, please set IP address

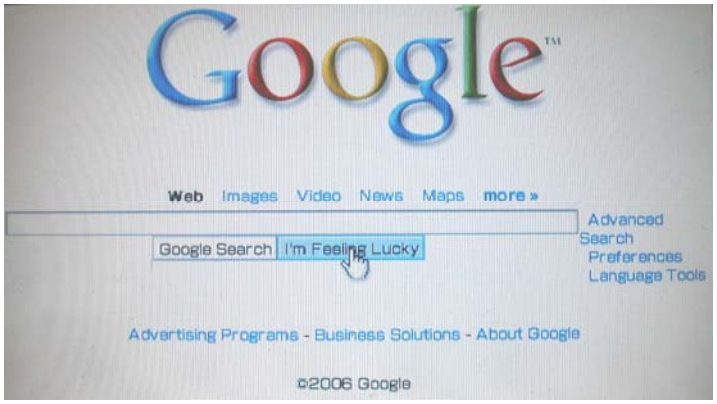


Step Nine： ”Proxy Server” select ”Do Not Use”

Step Ten： Select ”Test Connection”



Step Eleven： Test network connection. After the configuration that was set above, we can connect to web successfully. Till now, we have finished the configuration of PSP mode.



Appendix A: Glossary

- **IEEE 802.11b -** The IEEE 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. IEEE 802.11b networks are also referred to as Wi-Fi networks.
- **IEEE 802.11g -** Specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 8021b devices, and WEP encryption for security.
- **Ad-hoc Network -** An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent IEEE 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.
- **Infrastructure Network -** An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an IEEE 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.
- **SSID -** A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.
- **WEP** (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64 bit or 128 bit or 256 bit shared key algorithm, as described in the IEEE 802.11g standard.
- **Wi-Fi -** A trade name for the IEEE 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among IEEE 802.11b devices.
- **WLAN** (**W**ireless **L**ocal **A**rea **N**etwork) **-** A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.
- **WPA** (**W**i-Fi **P**rotected **A**ccess) **-** A wireless security protocol use TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.
- **AP- A**ccess **P**oint

- **PSK- P**re-**S**hared **K**ey
- **TKIP- T**emporal **K**ey **I**ntegrity **P**rotocol
- **AES- A**dvanced **E**ncryption **S**tandard
- **TLS- T**ransport **L**ayer **S**ecurity
- **TTLS- T**unnel **T**ransport **L**ayer **S**ecurity
- **PEAP- P**rotected **E**xtended **A**uthentication **P**rotocol
- **RADIUS- R**emote **A**uthentication **D**ial **I**n **U**ser **S**ervice

Appendix B: Specifications

Normal	
Interface	A-type USB 2.0 Connector
Standards	IEEE 802.1b; IEEE 802.1g
Operating System	Windows 98, ME, 2000, XP, 2003, 64bit XP
Transmission Distance	In door up to 100m, out door up to 300m (It is limited to the environment).
Radio Data Rate	54/48/36/24/18/12/9/6 Mbps 11g OFDM，11/5.5/3/2/1 Mbps 11b DSSS,(Auto Rate Sensing)
Modulation	11g OFDM , 11b CCK/DSSS
Media Access Protocol	CSMA/CA with ACK
Transmit Power	15dBm (Typical)
Data Security	WPA; 64/128/256 bit WEP; TKIP/AES; IEEE 802.1X authentication
Frequency	2.4～2.4835 GHz
Spread Spectrum	Direct Sequence Spread Spectrum (DSSS)
Safety& Emissions	FCC, CE

Physical Environmental	
Operating Temp	0℃～55℃ (32℉～104℉)
Storage Temp	-40℃～70℃ (-40℉～158℉)
Humidity	5%～90% RH, Non-condensing
Dimensions (W×D×H)	3.4×1.0×0.5 inch (85.7×25.9×11.8 mm)

Appendix C: Contact Information

For help with the Installation or operation of the TP-LINK TL-WN322G 54M Wireless USB Adapter, please contact us.

Website: http://www.tp-link.com